

Waukesha County Zoning and Erosion Control Workshop

January 13, 2017

Agenda

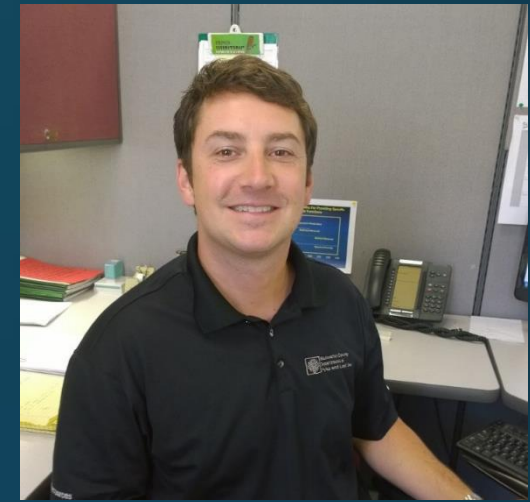
- **Session 1 – Basements, Erosion Control and Shoreland Zoning**
 - 8:30 – 10:30 am
- **Break**
 - 10:30 – 10:45 am
- **Session 2 – New Development Planning, Site Drainage Certification and Intergovernmental Agreements**
 - 10:45 – 12:00 pm



A Little About Me

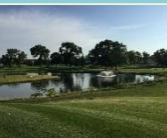
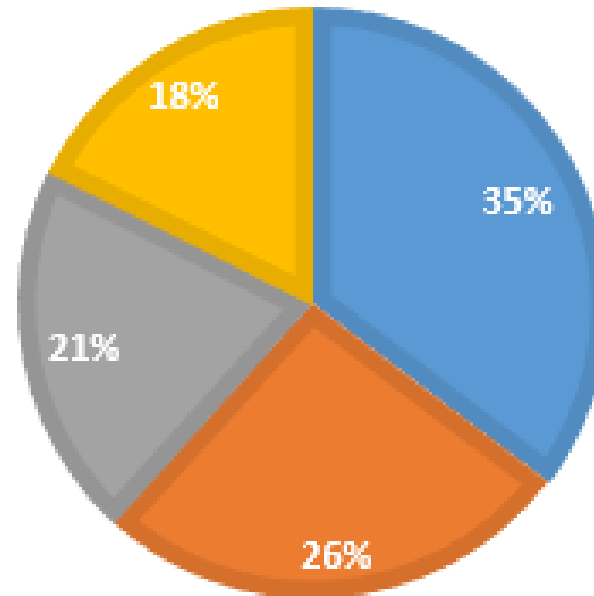
Alan Barrows

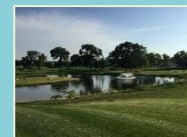
- Graduate from UW La Crosse with a BS in Geography
- Have worked for Waukesha County since 2002
- Review erosion control and stormwater management plans
- Review new land divisions for compliance with drainage standards
- Serve as the lead for basement & groundwater separation
- Certified by the State for erosion control inspection and soil testing (CST)
- Certified Erosion, Sediment and Stormwater Inspector (CESSWI)
- Certified Professional in Erosion and Sediment Control (CPESC)



WHO'S IN ATTENDANCE?

- County Staff
- Building Inspectors
- Municipal Planners
- Other (Administrators, DNR, etc.)





Developed Lands

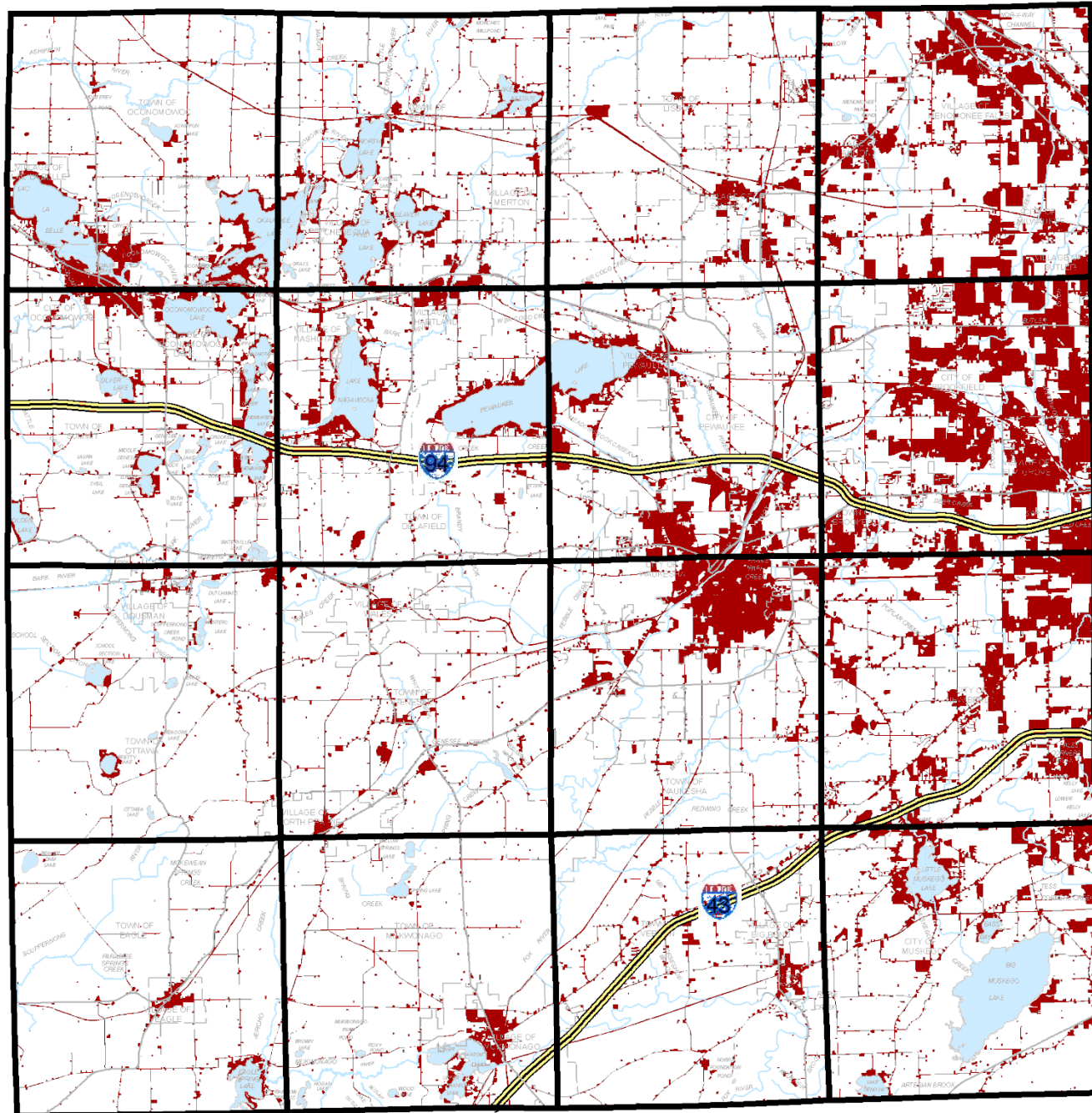
Waukesha County

1963

Legend



Urban and
residential land uses



Developed Lands

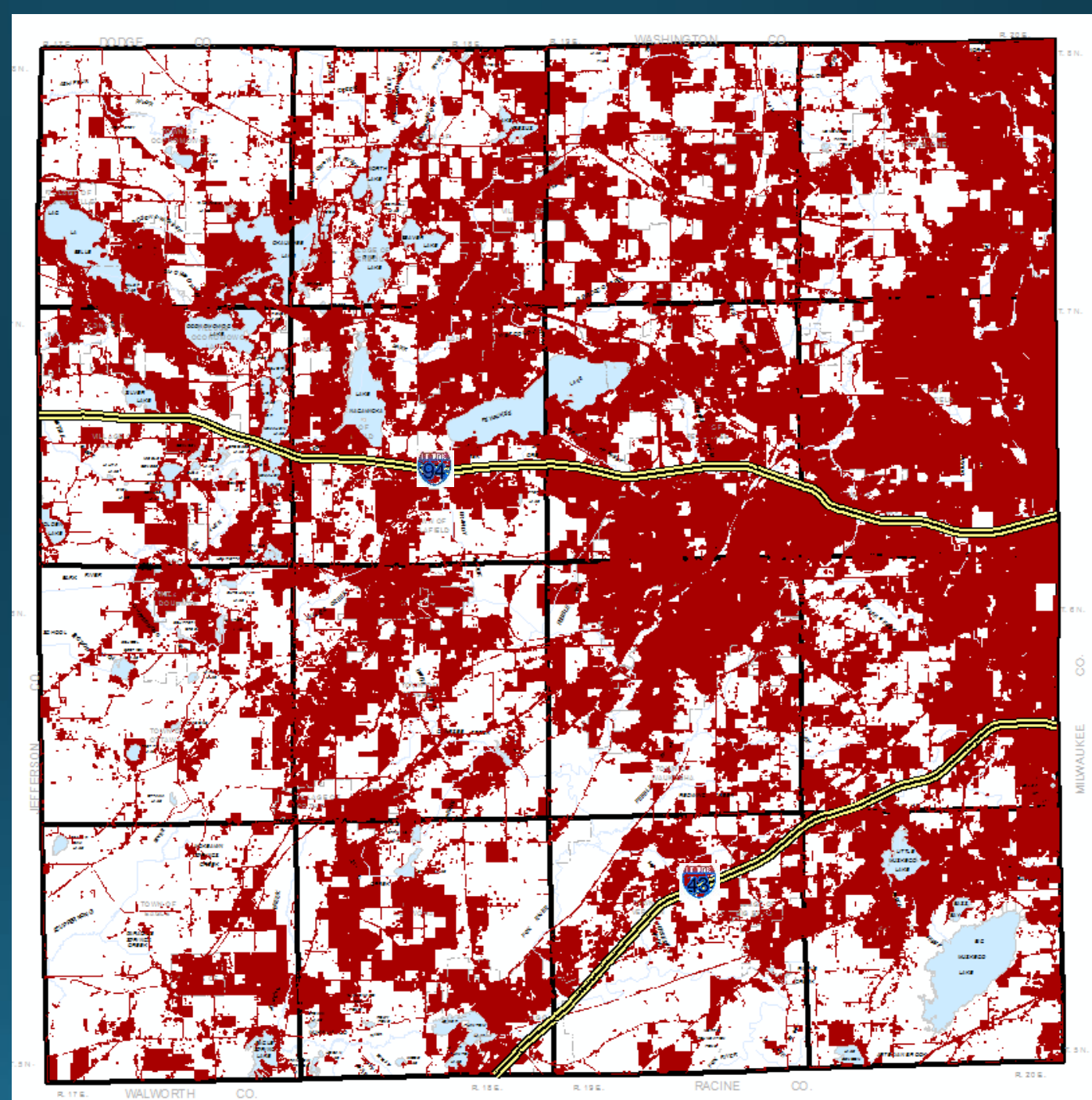
Waukesha County

2010

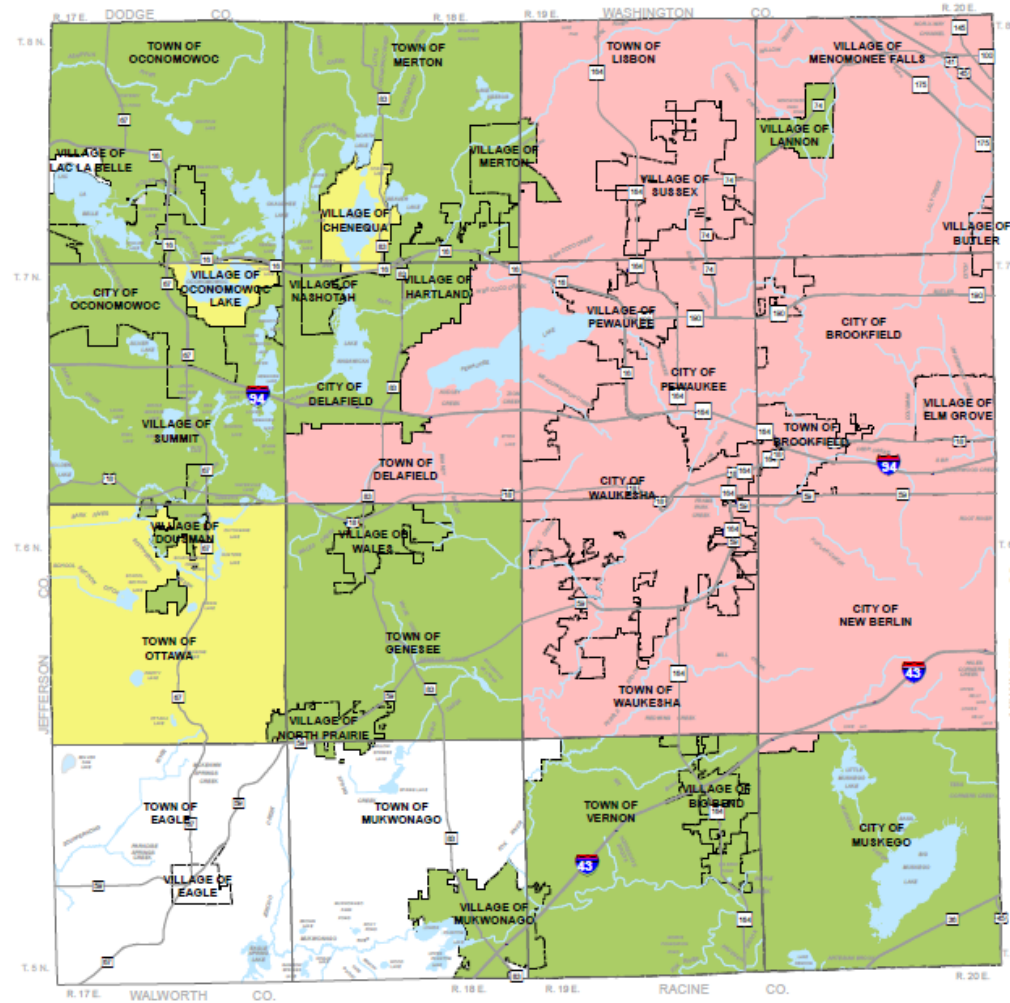
Legend



Urban and
residential land uses



MAP IV-2
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) DISCHARGE PERMITS UNDER NR216
WAUKESHA COUNTY: 2012

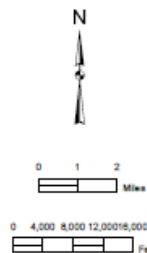


Legend

- Phase I Community (13)
- Phase II Community (18 including Waukesha County)
- Exempted Communities (3)
- MS4 Permit Not Required (4)

*Townships - Only portions meeting the Urbanized Area designation by the EPA

Source: Waukesha County & WDNR



31 Communities,
including Waukesha
County are under MS4
permit requirements.

MS4 means a
“municipal separate
storm sewer system”





MIKE DE SISTI / MILWAUKEE JOURNAL SENTINEL
Jacob Danby, with Coello & Associates of Waukesha, clears dirt Tuesday at the site of a home being built by Belman Homes in the Rolling Oaks II neighborhood in Waukesha.

Metro homebuilding permits rise 14% in '16

Optimism carries over to new year

PAUL GORES
MILWAUKEE JOURNAL SENTINEL

Permits to construct new homes in the metro Milwaukee area were issued at the fastest pace in nine years in 2016.

Officials in Milwaukee, Ozaukee, Washington and Waukesha counties distributed 1,381 homebuilding permits last year, up almost 14% from 1,213 in 2015, new statistics from MTD Marketing Services of Wisconsin Inc. show.

While the 2016 total still is less than half the number of permits seen during the height of the pre-recession building boom, the improvement was a welcome development for area builders after two consecutive relatively



A home takes shape in the Rolling Oaks II neighborhood in Waukesha. Waukesha had 75 permits last year.

flat years.

"We're feeling a lot more optimism and confidence from buyers as well as builders," said Kristine Hillmer, executive director of the Met-

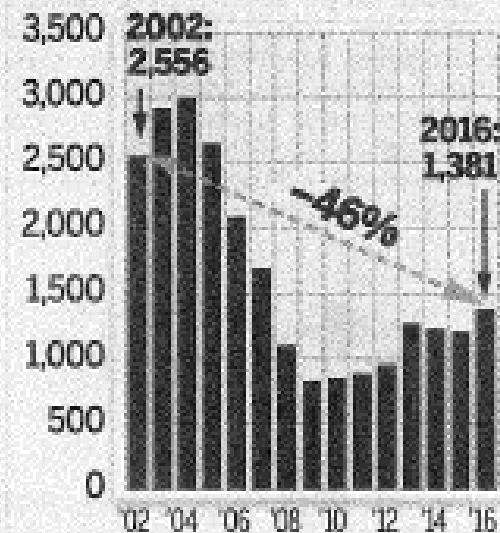
ropolitan

Builders Association. "There is just an increase in optimism on what's happening. Now, it's

See HOMES, Page 3D

Metro Milwaukee homebuilding permits

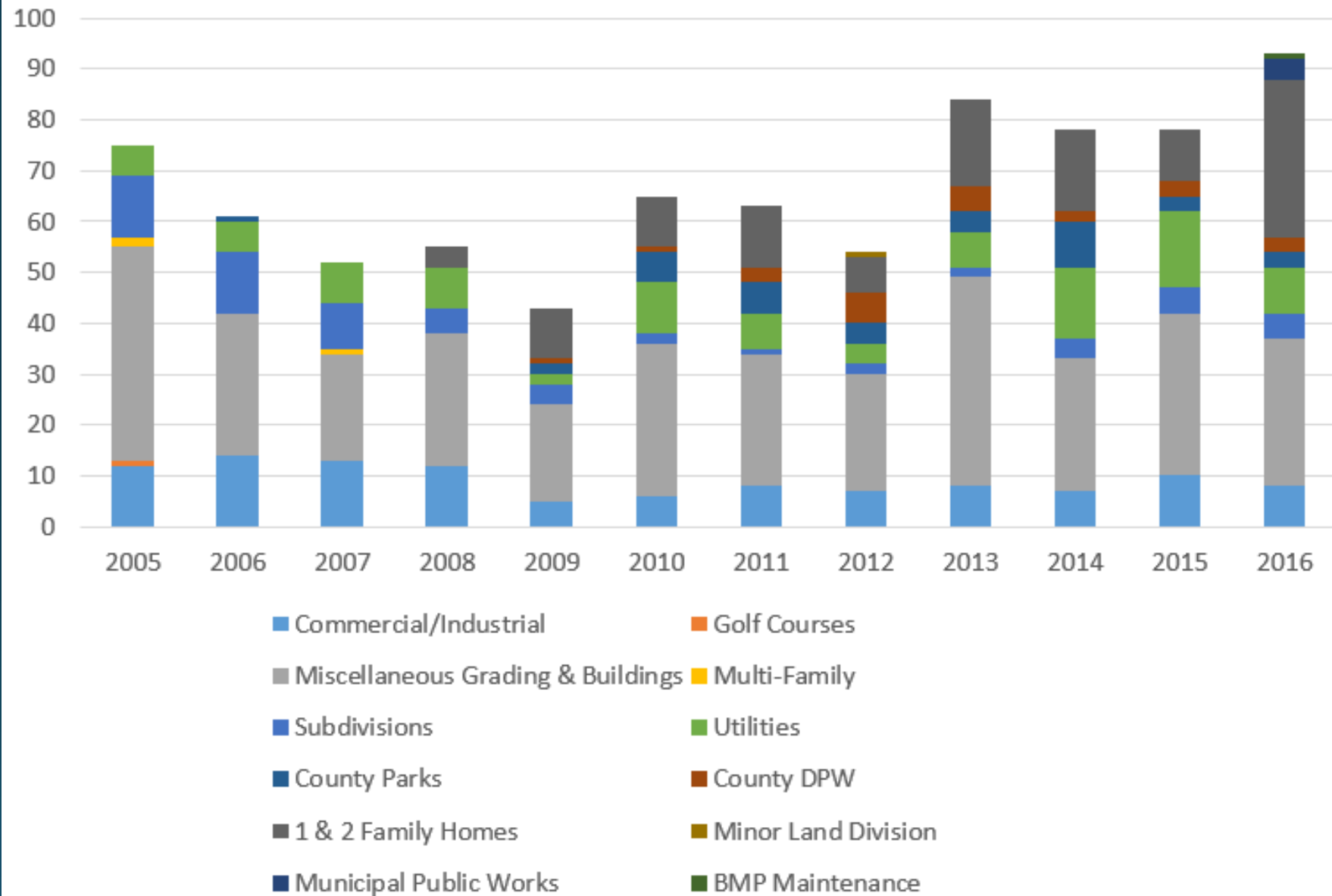
Permits to construct new homes in Milwaukee, Ozaukee, Washington and Waukesha counties rose almost 14% last year.



Source: MTD Marketing Services of Wisconsin Inc. Journal Sentinel



Number of Stormwater Permits Issued by Year by Type 2005 - 2016



Source: Waukesha County Stormwater Database



Tearing Down Lake Cottages



Waukesha Co. Stormwater & Erosion Control Ordinances

1992 – Construction Site Erosion Control

1998 – Construction Site Erosion Control & Storm
Water Management

- Water Quality
- Peak Flows

2005 – Construction Site Erosion Control & Storm
Water Management

- Water Quality
- Peak Flows
- Volumes (infiltration/reuse)
- Thermal Impacts

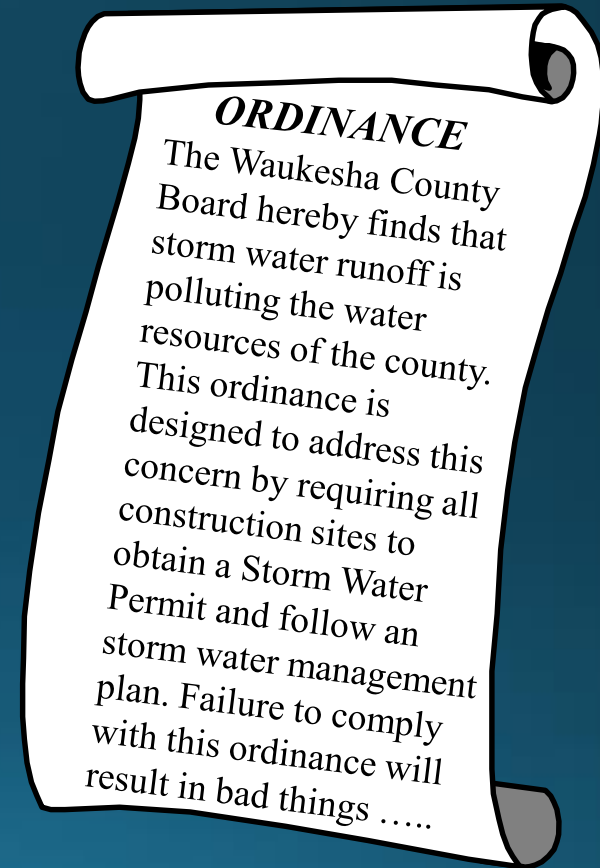
2011 – Authorized to Issue WPDES Permit Coverage

2016 – Stormwater Management and Erosion Control Updates
Erosion Control

- DNR's USLE Spreadsheet

Stormwater Management

- Atlas 14 Rainfall Depths and Distribution



Stormwater Program Information

Waukesha County Stormwater Management and Erosion Control Program



Department of Parks and Land Use
Land Resources Division (LRD)

Rev. 1/28/16

Maintenance Agreements

A maintenance agreement is required for all permanent stormwater BMPs that are installed to comply with the requirements of the County Ordinance. The maintenance agreement must be independent of all other restrictions or covenants. The agreement must address the following BMP maintenance issues following county standards: ownership, location, design, maintenance plan, access, maintenance responsibility, inspection, cost distribution, enforcement and agreement modification. The County has prepared sample maintenance agreements, which are available on the County's website.

Waukesha County Department of Parks and Land Use – Land Resources Division

515 W. Moreland Blvd.
Room AC260
Waukesha, WI 53188
Phone: (262) 896-8300
Fax: (262) 896-8298

For More Information Visit
www.waukeshacounty.gov/stormwater

Click on the three blue buttons on the webpage for application materials, plan review checklists and technical design resources.

or

Call (262) 896-8300 and ask to speak with the
Conservationist of the Day.

Project Engineer

For sites that require a stormwater management plan, the permit holder must provide an engineer licensed in the state of Wisconsin to be responsible for achieving compliance with approved construction plans, including the implementation of the approved inspection plan and verification of construction in accordance with the County ordinance.

Landscape Architect or Native Vegetation Specialist

If warm season or wetland plantings are involved, the permit holder must also provide a landscape architect or other applicable native vegetation specialist to oversee and verify the planting process and its successful establishment. Warm season plants generally have a deep root system, which enhances stormwater infiltration.

Maintenance of Stormwater Best Management Practices

Over time, stormwater BMPs will need maintenance. A qualified inspector should visit BMPs annually to determine maintenance needs. Maintenance work should be completed the same season. Common annual maintenance includes mowing, landscaping, outlet pipe cleaning, brush removal, erosion repair and sediment removal. Less frequent and more costly maintenance includes tree removal, dredging, outlet replacement, channel lining and berm reconstruction.



Basement Wetness & Flooding Prevention Standards

- Standards exist in the County's Basic Zoning, Shoreland/Floodland and Storm Water Ordinances;
- Applies to buildings designed for human occupation on a regular basis (homes, schools, churches, businesses, municipal buildings, etc.);
- Requires cooperation between our Divisions to "get the word out" and for efficient administration.



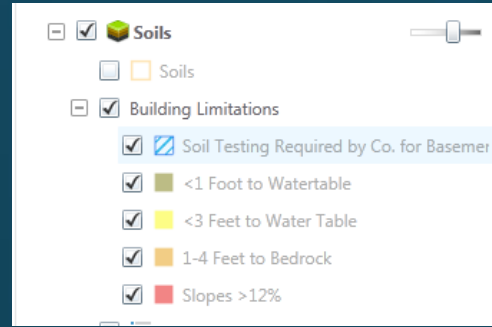
Basement wetness prevention



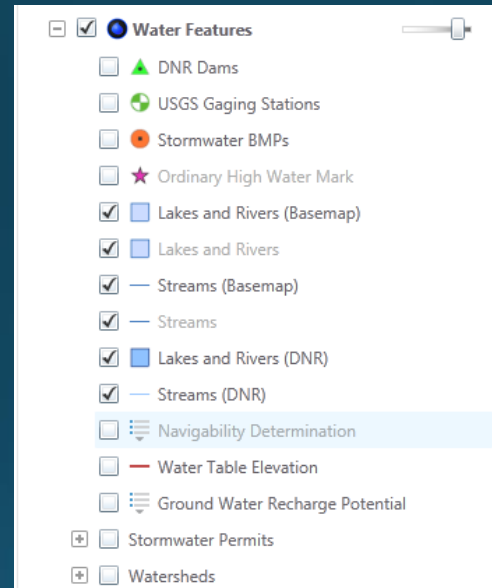
SITE SCREENING

- Wet soils
- 8 feet to water
- Soil tests
- Knowledge of shallow groundwater
- Common sense

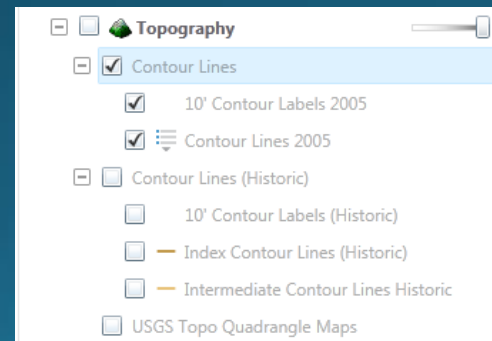
Soils



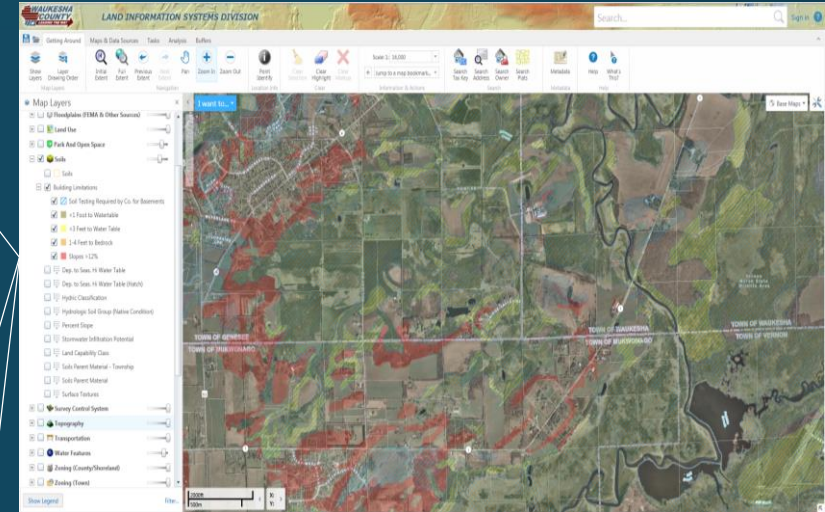
Water



Contour Lines



GIS



Soil Formation & Terminology

Alluvium – Stream Deposits

Lacustrine – Lake Deposits

Glacial Till – Mix of Sand, Silt, Clay and Boulders

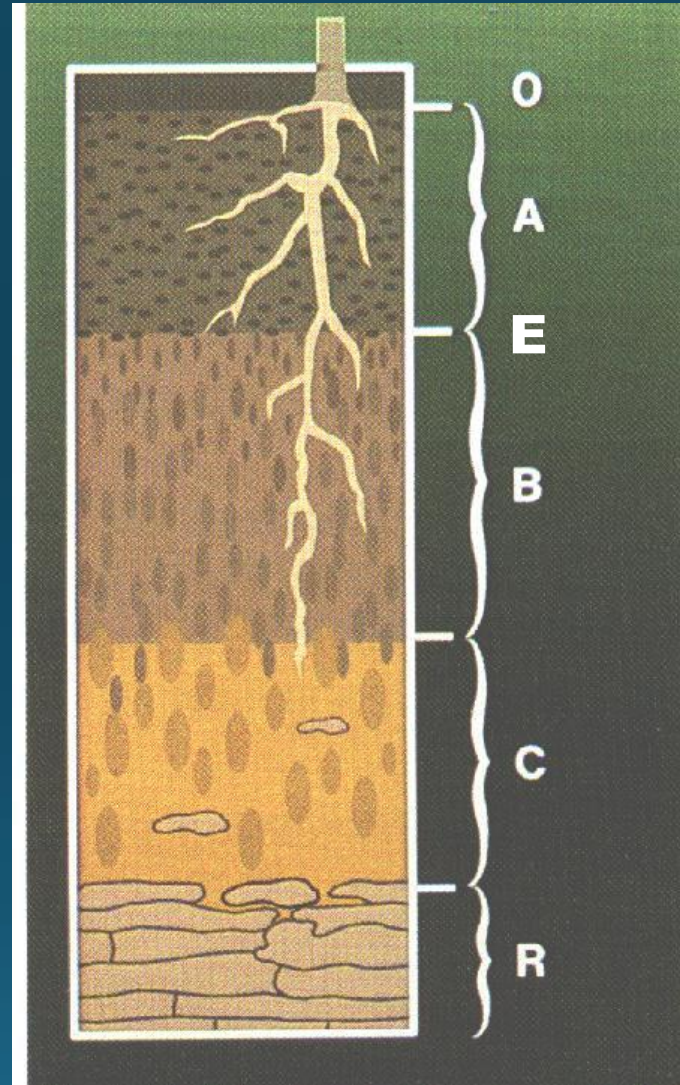
Outwash – Meltwater Deposits

Organic – Decomposing Plant Material

Aeolian/Eolian/Loess – Wind Deposits

Eluviation – Decomposition in Place

Illuvial – Leached Materials Moving Downward



O – Organic horizon

A – Organically enriched mineral horizon

E – Mineral horizon of eluviation

B – Mineral illuvial horizon formed below an A, E, or O horizon

C – Horizons excluding hard bedrock little affected by soil genesis

R – Hard bedrock



Documentation

- Standardized State forms (SPS)

Wisconsin Department of Commerce
Division of Safety and Buildings

SOIL EVALUATION - STORM

In accordance with Comm 82.365 & 85, Wis. Adm. Code

Page ____ of ____

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

Property Owner		Property Location	
Property Owner's Mailing Address		Govt. Lot 1/4 1/4 S T N R E (or) W	
City State Zip Code Phone Number		Lot # Block # Subd. Name or CSM#	
		<input type="checkbox"/> City <input type="checkbox"/> Village <input type="checkbox"/> Town Nearest Road	

Drainage area <input type="checkbox"/> sq. ft. <input type="checkbox"/> acres	Hydraulic Application Test Method:
Optional:	<input type="checkbox"/> Morphological Evaluation
Test Site Suitable for (check all that apply)	<input type="checkbox"/> Double-Ring Infiltrometer
<input type="checkbox"/> Irrigation <input type="checkbox"/> Bioretention trench <input type="checkbox"/> Trench(es)	<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Rain garden <input type="checkbox"/> Grassed swale <input type="checkbox"/> Reuse	
<input type="checkbox"/> Infiltration trench <input type="checkbox"/> SDS (> 15' wide) <input type="checkbox"/> Other _____	

<input type="checkbox"/> Obs. #	<input type="checkbox"/> Boring	Ground surface elev. _____ ft.		Depth to limiting factor _____ in.		Hydraulic App. Rate	
	<input type="checkbox"/> pit					Inches/Hr	
Horizon	Depth In.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary % Rock Frag.

<input type="checkbox"/> Obs. #	<input type="checkbox"/> Boring	Ground surface elev. _____ ft.		Depth to limiting factor _____		
	<input type="checkbox"/> pit					
Horizon	Depth In.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence

CST/PSS Name (Please Print) Signature
Address Date Evaluation Conducted



Mottling



~~Dirt~~

Soil

Pella



Morley

10.28.20



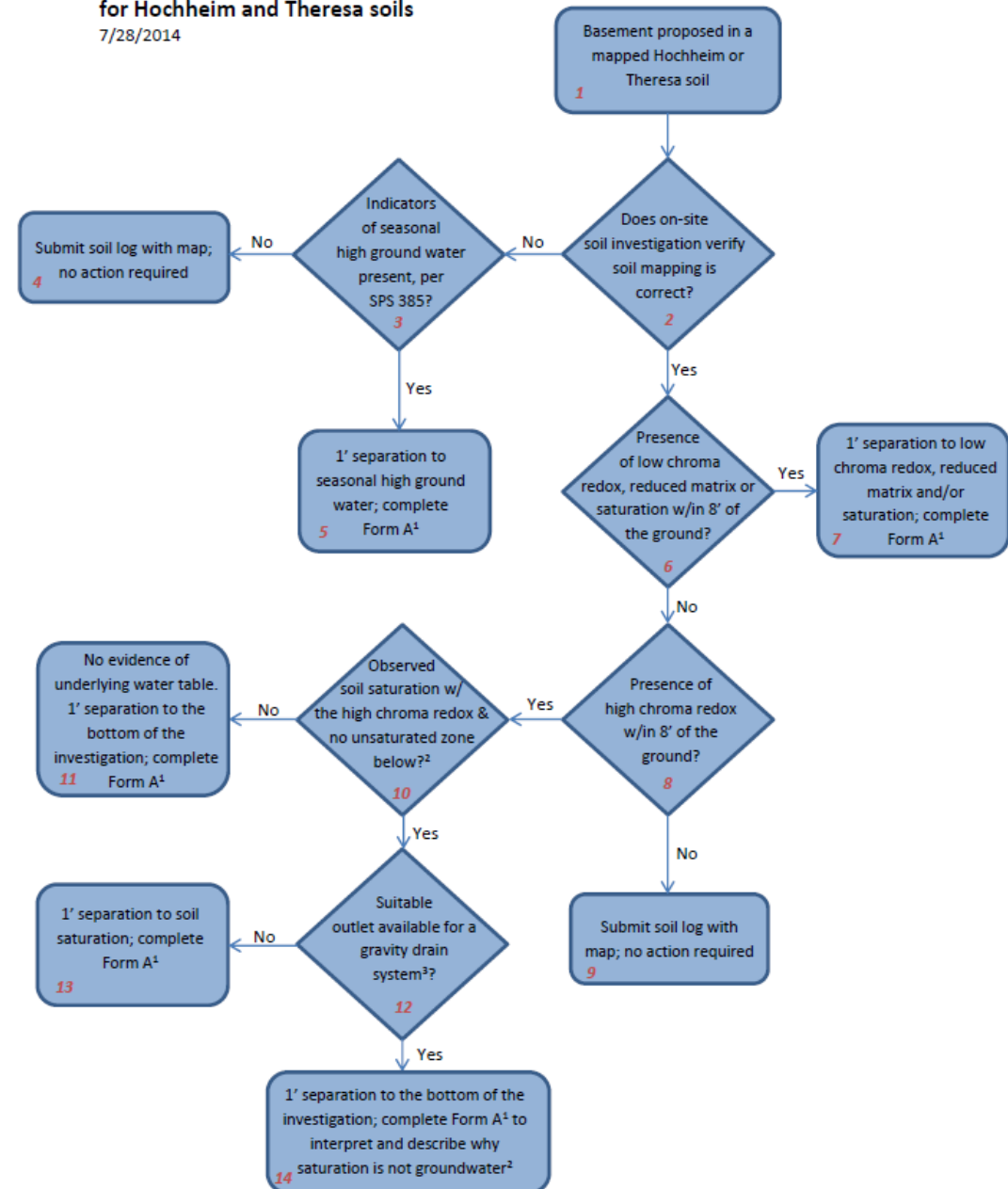
Hochheim & Theresa Flowchart

(DENSE GLACIAL TILL SOILS)



Basement/groundwater separation procedure for Hochheim and Theresa soils

7/28/2014



¹Form A is the seasonal high groundwater determination report which can also serve as an interpretative determination per SPS 385.60.

²The County may require soil investigations be completed to demonstrate saturated conditions do not exist at other times of the year.

³Plans must meet County standards; including design, construction verification and recording as-builts and maintenance plan.



Documentation

- Standardized Interpretation Form (PLU)

Form A - Seasonal High Groundwater Determination Report

Project/Plat Name: _____ Date: _____

Project Location (PLS/CSM#): _____

The following table summarizes my interpretation of the soil profile evaluations conducted on the above noted site. The purpose of this report is to demonstrate compliance with a Waukesha County ordinance requirement to maintain basement floor elevations at least 1 foot above the seasonal high water table. I understand that the definition for seasonal high water table means the upper limit of the zone of soil saturation caused by underlying groundwater at its highest level. I certify that the information presented in this report represents my best professional judgment in estimating seasonal high water table based on soil and site evaluations in accordance with the procedures contained in Chapter SPS 385 Wisconsin Administrative Code.

Stamp, Sign & Date Here

Interpreters Signature: _____

Interpreters Printed Name/Credentials/Lic. #: _____

Interpreters Company Name/Address: _____

Site Benchmark/Elevation (Co. Stds.): _____

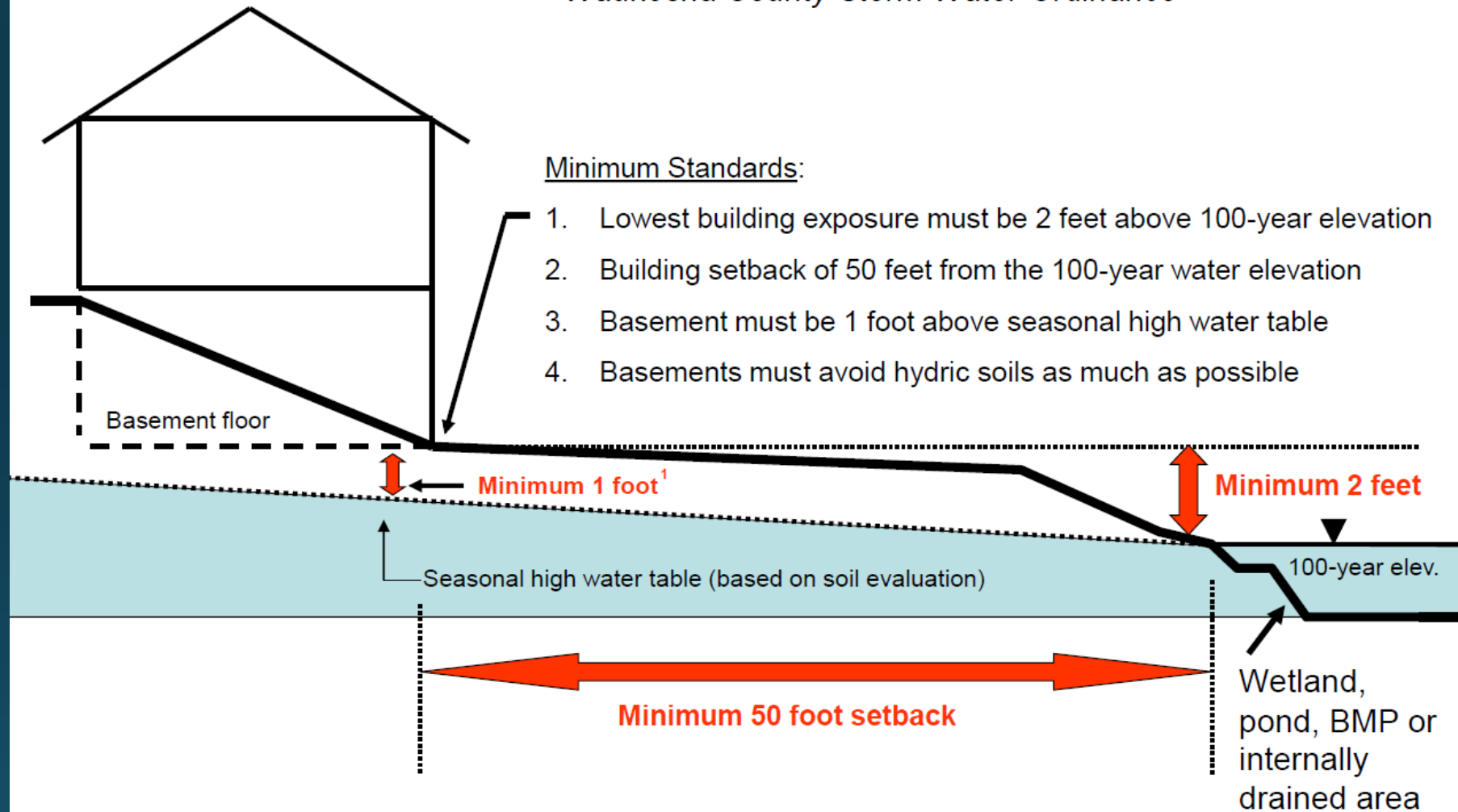
References: (sample) The following references apply to the data presented herein: 1) Map 1 for soil test pit locations; and 2) Dept. of Safety and Professional Services Soil Evaluation forms (5 sheets).

Lot #	Soil Observ. (#)	Surface Elev. (NGVD 29)	Bottom Elev. of Soil Profile	Soil Map Unit Symbol (NRCS)	Elevation of Seasonal High Water Table	Depth to Seasonal High Water Table (Feet)	Proposed Basement Floor Elevation	Notes: List information used to determine seasonal high water table, including any soil color pattern exemptions under SPS 385.30(3) for a basement floor proposed less than 1-foot above redoximorphic features shown in the referenced soil evaluation reports.
(sample)	103	900.0	889.2	HmB	893.4	6.6	894.4	Soil saturation at elev. 889.8 and redox features up to 893.4. Unsaturated loamy sand between elevations 893.4 to 895.0. Less prominent redox features between elev. 895.0 and 897.0 determined to be caused by texture of B2t horizon [tension zone under SPS 385.30(3)3.], not seasonal high groundwater conditions, as defined above.



Minimum Site Drainage Standards

Waukesha County Storm Water Ordinance



¹ On sloped sites, the soil evaluation results must be interpolated through the building site. If any portion of the proposed basement floor is less than one foot above the seasonal high water table, a gravity drain system and suitable outlet is required. Contact the Waukesha County Department of Parks and Land Use for details (262) 896-8300.



If any portion
of the
basement will
not have 1-
foot of
separation,
then...

Paul Farrow
County Executive



Dale R. Shaver
Director

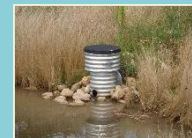
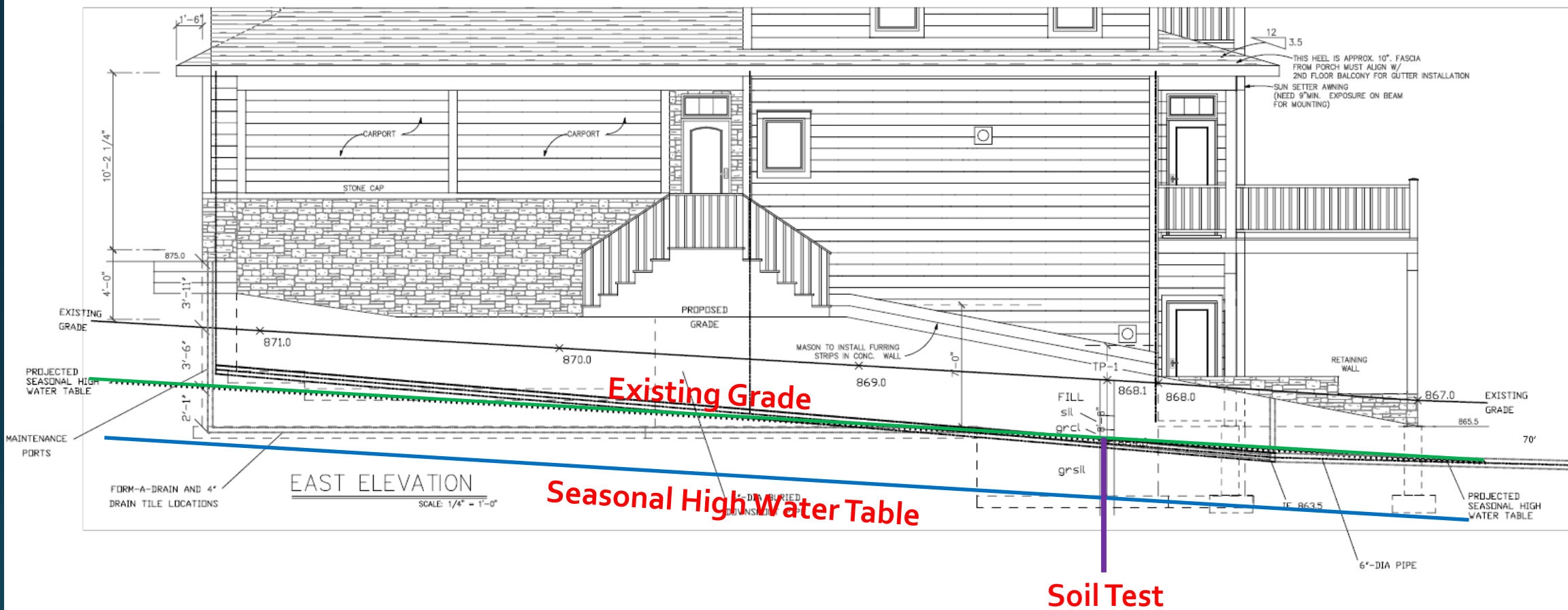
Foundation Drainage System Checklist
For Basements Constructed Partially Below Highest Groundwater Table
Where Gravity Flow Outlets Are Available

- **Soil Data.** Submittal of a Soil Investigation Report completed by a Certified Soil Tester or Soil Scientist only and Form A – Highest Groundwater Table Determination Report, completed by a Certified Soil Tester, Soil Scientist, P.E., or Hydrogeologist in accordance with standards contained in Chapter SPS 385 WI Admin. Code. Form A must identify the elevation of the highest water table within 50 ft. of the proposed structure. Multiple soil tests may be required based on topography and variable soil conditions.
- **Basement Drainage System Plan.** Submitted by a qualified professional engineer, to include the following:
 - Narrative describing key components of the proposed drainage system and how it will work.
 - Plan view, cross-section and profile drawings of the proposed system with key elevations, pipe grades, dimensions, etc. Show details where pipes are proposed to cross or connect.
 - System design must include or address the following:
 - Flow calculations for groundwater seepage and system conveyance.
 - Measures to intercept flows and/or alleviate hydrostatic pressure on the walls and floor of the structure.
 - Separation of sump pump system, gravity drains, and exterior down spouts. If connections are proposed, flow impacts must be described and supported by calculations.
 - Access/clean out traps for future maintenance.
 - Location and detail design of the outfall structure, including material specifications, elevations, cover depth/frost protection, animal guards and erosion control measures.
 - The outfall shall not cause adverse drainage on adjacent properties or road right-of-ways, or negatively impact natural resources. Written approval of the downstream landowners or municipality (if public road), may be required.
 - Material specifications for all key components of the system.
 - Construction inspection plan and contact information for the engineer who will oversee and verify proper system installation.
 - Long term maintenance plan and procedures.
- **Recorded Maintenance Plan & As-built Drawings.** The maintenance plan must be recorded on the deed to notify future owners of the existence of the basement drainage system, its purpose, design, construction, and long-term maintenance needs. A professional engineer licensed in the State of Wisconsin must oversee installation of the drainage system and verify proper construction, including the use of specified materials and an as-built survey of key system elevations. As-built documents and a construction verification letter by the project engineer must be recorded as part of the Maintenance Plan (may be an addendum).

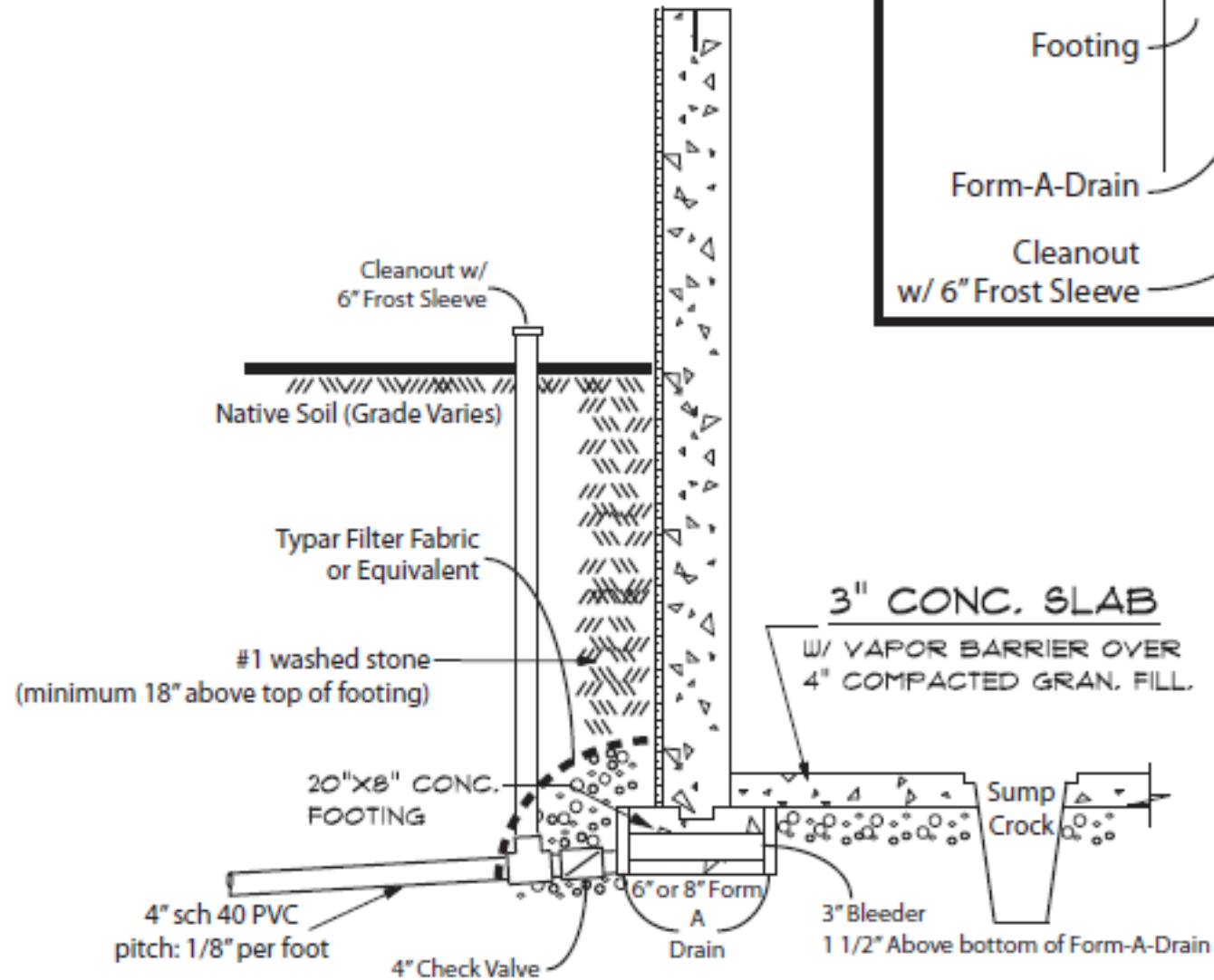
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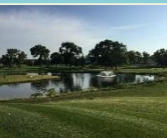
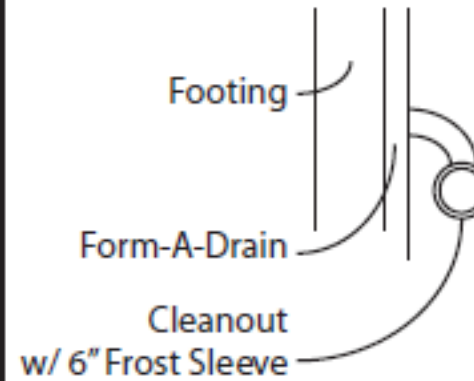
Interpolating the soil test results through the proposed foundation



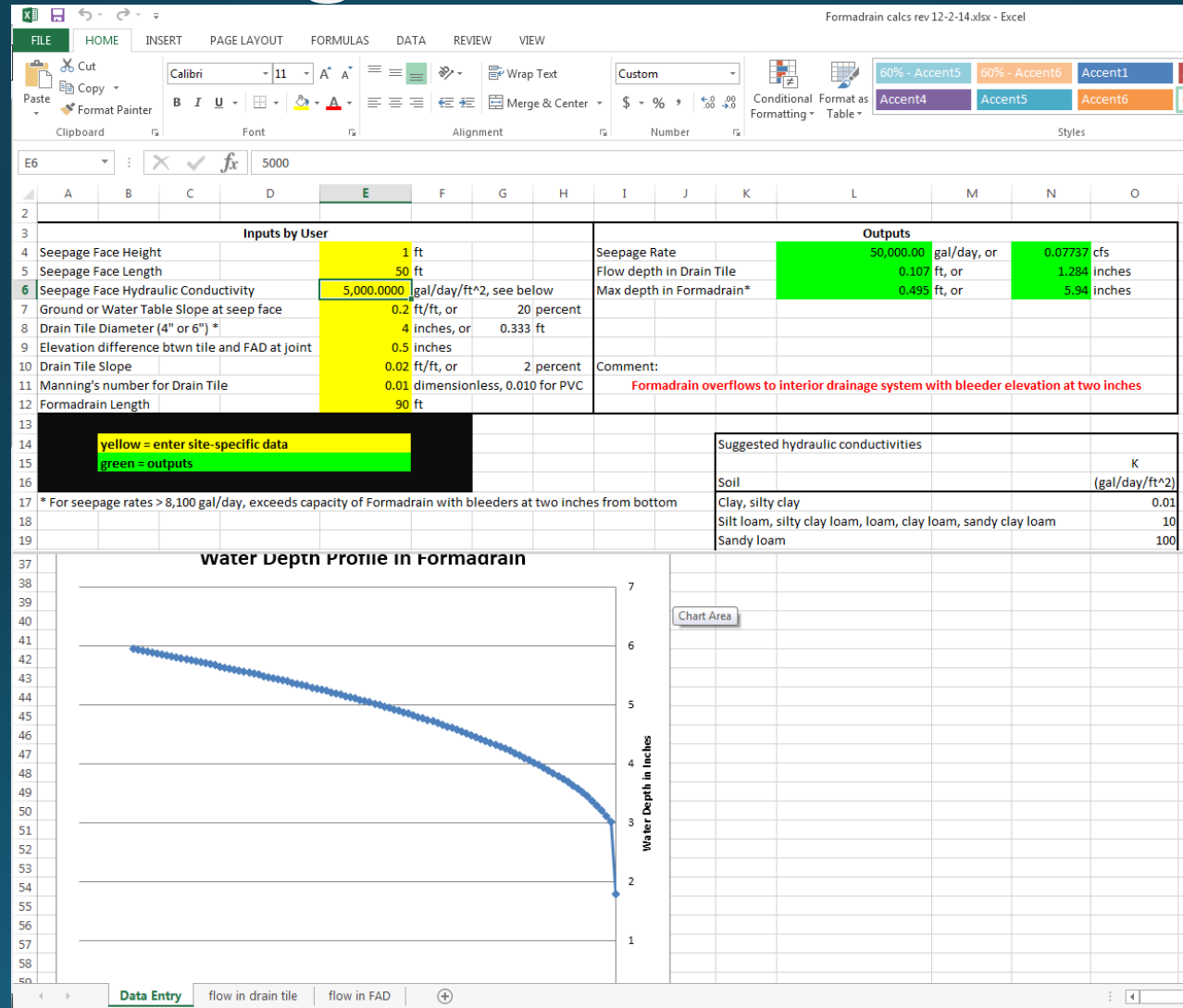
Cross Section Detailed



Plan View Detail 1



LRD Spreadsheet for Calculating Flows Through form-a-drain



Sample Recorded Maintenance Plan

<u>FOUNDATION DRAINAGE SYSTEM MAINTENANCE PLAN</u>	
<u>Document Number</u>	Document Title
<u>Return Address:</u> Waukesha County Dept. of Parks and Land Use – Land Resources 515W. Moreland Blvd., Room AC 260 Waukesha, Wisconsin 53188	
<u>Parcel Identification Number (PIN):</u>	

_____, as the “Owner” of the property known as _____,
located in part of the ____th of Section ____ of Section ____, T __N, R __E, Town of _____,
Wisconsin (the “Property”) acknowledges that a foundation drainage system has been installed
due to the basement being partially below the seasonal high ground water level. The foundation
drainage system is gravity-fed and has been designed to intercept ground water seepage,
minimize ground water intrusion into the basement and route intercepted water around the
residence before being discharged.

The purpose of this document is to record the foundation drainage system design and to explain
the long-term maintenance instructions to minimize ground water intrusion into the basement.
This maintenance plan includes the following exhibits:

- Exhibit A:** Legal Description – Shows the property for which this plan applies (“Property”)
- Exhibit B:** Drainage System Plan - Plan view and cross-section drawings of the design
- Exhibit C:** Maintenance Plan – Prescribes those activities that must be carried out to
maintain the foundation drainage system.

Through execution of this document, the Owners hereby subject the Property to the following
covenants, conditions and restrictions:

1. After construction verification has been accepted by Waukesha County staff for the
foundation drainage system, an addendum to this maintenance plan shall be recorded by
the Owner. The addendum may contain several additional exhibits, including an as-built
survey and a verification letter from the project engineer.
2. The Owners shall be responsible for the routine and extraordinary maintenance and repair
of the foundation drainage system identified in Exhibit B;
3. The Owners shall inspect and properly maintain the foundation drainage system outlined
in Exhibit C;
4. These covenants, conditions and restrictions are to go with the land and are to transfer to
all successors, heirs and assigns. The Owner may modify this maintenance plan by a
written instrument executed by the Owner and Waukesha County.

The undersigned is aware that Waukesha County and the Town of _____ shall not be
liable for the failure of the basement due to water or any other condition or for the pre- or post-
construction of the residence or attached garage.



Inspection Schedule

Foundation Drainage System Inspection Schedule

Project Name: _____

Storm Water Permit #: _____

Project Location: Section ____, Town of _____

Elements for Inspection	Inspection By	Approx. Date of Inspection or When in Construction Sequence	Notice Needed	Phone Number for Inspection	Inspector	Inspectors Initials	Date of Inspection
Footing Drain & Bleeders							
Footing Inspection	Building Inspector						
Foundation Inspection	Building Inspector						
Foundation Waterproofing							
Foundation Drain Tiles	Project Engineer						
Washed Stone & Fabric	Project Engineer						
Backfill							
Clean Out Ports	Project Engineer						
Outlet Pipe Connection and Outfall	Project Engineer						
Outfall Scour Protection							
County Final inspection: Rodent Protection, Outfall Vegetation, Grading, Stabilization, Sediment Control BMP Removal	Land Resources Division		7 days	262-896-8300			



Thank you

Any Questions?

